

WHAT IS CLAIMED IS:

1. In a system for direct electrochemical measurement of enzymatically liberated hydrogen peroxide formed incident to the biocatalytic conversion of an analyte of interest, wherein said analyte is (a) initially exposed to an oxidase specific enzyme for biocatalytic conversion of said analyte into one or more by-products, including hydrogen peroxide, and (b) said hydrogen peroxide is reduced, under electrochemical conditions, so as to generate an electrical signal indicative of the presence and/or concentration of said analyte in said sample, wherein the improvement comprising:

A. Providing a biosensor assembly comprising a working electrode and a counter electrode, said working electrode having an effective amount of enzymatically active oxidase specific for biocatalytic conversion of an analyte of interest into one or more by-products, including hydrogen peroxide, and a metal doped carbon composition—specific for catalytic reduction of enzymatically-liberated hydrogen peroxide;

B. Means for applying an electrical potential to said electrodes, wherein said potential is within a range of from about +0.4 to about -0.3;

C. Means for monitoring, under electrochemical conditions, the rate of catalytic reduction of enzymatically-liberated hydrogen peroxide by said working electrode; and

D. Means for correlating said rate of reduction of said enzymatically-liberated hydrogen peroxide by said working electrode with the concentration in said analyte in a aqueous fluid sample.

2. The improved system of Claim 1, wherein the biosensor assembly comprises three electrodes, a working electrode, a counter electrode and a reference electrode.

3. The improved system of Claim 1, wherein the a metal doped carbon composition comprises a hydrogen peroxide reduction effective amount of a metal

catalyst selected from the group consisting of rhodium (Rh), ruthenium (Ru), iridium (Ir), their respective mixtures and an alloy thereof.

4. The improved system of Claim 1, wherein the biosensor assembly is
5 essentially devoid of a perm-selective membrane.

5. The improved system of Claim 1, wherein in Step B said potential is within a range of from about +0.10 V to about -0.20 V

10 6. In a method for direct electrochemical measurement of enzymatically liberated hydrogen peroxide formed incident to the biocatalytic conversion of an analyte of interest, wherein said analyte is (a) initially exposed to an oxidase specific enzyme for biocatalytic conversion of said analyte into one or more by-products, including hydrogen peroxide, and (b) said hydrogen peroxide is reduced, under
15 electrochemical conditions, so as to generate an electrical signal indicative of the presence and/or concentration of said analyte in said sample, wherein the improvement comprising:

A. Providing a biosensor assembly comprising an electrode array having a
20 working electrode and a counter electrode, said working electrode having an effective amount of enzymatically active oxidase specific for biocatalytic conversion of an analyte of interest into one or more by-products, including hydrogen peroxide, and a metal doped carbon composition specific for catalytic reduction of enzymatically-liberated hydrogen peroxide;

25 B. Applying an aqueous test sample suspected of containing an analyte of interest to said electrode array of said biosensor, under biocatalytic conditions;

C. Applying an electrical potential to said electrode array under catalytic
30 reduction conditions;

D. Monitoring an electrical signal generated by said catalytic reduction of enzymatically-liberated hydrogen peroxide over a period of time until constant;

E. Correlating said constant electrical signal with a concentration of said
5 analyte in said aqueous sample.

7. In a biosensor assembly for the selective determination of an analyte in an aqueous sample by direct electrochemical measurement of enzymatically liberated hydrogen peroxide, the improvement comprising:

5 a working electrode and a counter electrode, said working electrode comprising an electrically conductive deposit having an effective amount of enzymatically active oxidase specific for biocatalytic conversion of an analyte of interest into one or more by-products, including hydrogen peroxide, and a metal doped carbon composition specific for catalytic reduction of enzymatically-liberated hydrogen peroxide, said working electrode being devoid of a perm-selective membrane and yet
10 effective for selective determination of enzymatically-liberated hydrogen peroxide over a potential range of about +0.10 V to about -0.20 V in an aqueous sample.

8. The improved biosensor of Claim 7, wherein said electrodes are sandwiched between a first insulating layer and a second insulating layer, said first
15 insulating layer being longer than said insulation layer, and said second insulating layer having an aperture corresponding to an analysis or test site for application of an aqueous test sample onto said working electrode.

9. The improved biosensor of Claim 8, wherein the test site includes a
20 filter member for particulate materials contained in said aqueous sample.

10. The improved biosensor of Claim 8, wherein the biosensor assembly comprises three electrodes, a working electrode, a counter electrode and a reference electrode.

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11. The improved biosensor of Claim 8, wherein the working comprises a hydrogen peroxide reduction effective amount of a rhodium catalyst.